

عنوان مقاله:

Design and Fabrication of Silicon-less Probe for Neural Stimulations

محل انتشار:

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خلاصه مقاله:

In this paper an optical splitter has been designed as a light delivery system to stimulate neurons optically. Current optical splitters are only for one stimulation way. However variant optical stimulation techniques affect using separate wavelengths. This waveguide has equal output power quantities for a wide range of input wavelengths at its outputs. So this design leads to a multipurpose device applicable for several optical stimulation methods in transcranial or intracortical experiments. The fabrication processes for these splitters are mostly silicon based. Silicon is used as the substrate or the core material of the waveguide. Despite the feasibility of their batch fabrication, it is difficult and expensive. On the other hand silicon is rigid in comparison to polyimide materials. So it is not suitable for implantation. In this plan, SU8 polyimide waveguide is formed on a flexible layer as a substrate with a fabricated trench to couple light from optical fibers into the waveguide. The cross section of the waveguide is a $40\mu\text{m} \times 40\mu\text{m}$ square. All of the materials used in this fabrication process are completely biocompatible. We introduce an easy fabrication process for this device. The device is only implanted in its tab. Hence it has less invasive effects into the brain tissue.

کلمات کلیدی:

light delivery, waveguide, optical splitter, optogenetics, infrared neural stimulation

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